HONORABLE JOHN C. COUGHENOUR

IN THE UNITED STATES DISTRICT COURT
FOR THE WESTERN DISTRICT OF WASHINGTON
AT SEATTLE

WILD FISH CONSERVANCY,

Plaintiff,

v.

COOKE AQUACULTURE PACIFIC, LLC,

Defendant.

Case No. 2:17-cv-01708-JCC

FIRST DECLARATION OF TOBIAS DEWHURST, PhD

I, Tobias Dewhurst, PhD, declare the following on the basis of personal knowledge to which I am competent to testify:

PROFESSIONAL QUALIFICATIONS

1. My current work address is 2 Portland Fish Pier, Portland, Maine 04101. I am a hydrodynamics engineer with Maine Marine Composites (MMC);

2. I began work as a hydrodynamics engineer and project manager at MMC in 2016. My specializations include wave-structure interaction, hydrodynamics, marine renewable energy, and aquaculture, among other areas of interest;

3. I received my Doctor of Philosophy in Mechanical Engineering from the University of New Hampshire in 2016. I received my Masters of Science in Ocean Engineering

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from the University of New Hampshire in 2013.

4. My additional professional qualifications, including education, peer-reviewed publications, presentations, and awards in my field are contained in my Curriculum Vitae, which is attached as Exhibit A to this Declaration.

5. I have been retained by Wild Fish Conservancy, through its counsel, to provide an expert report and opinions in the matter of *Wild Fish Conservancy v. Cooke Aquaculture Pacific, LLC*, Case No. 2:17-cv-01708-JCC. In addition, I have been asked to provide this Declaration in support of Plaintiff's Response to Cooke Aquaculture's Motion for Partial Summary Judgment. The opinions expressed in this Declaration are a subset of the opinions I will provide in my expert report, which is currently due April 10, 2019.

6. In addition to drawing upon my knowledge and expertise, and a general review of relevant literature in this field, I have reviewed the following documents in developing my opinions expressed herein:

a. Cooke NPDES Permits, fact sheets, and permit applications
b. Cooke's Pollution Prevention Plans, Fish Escape Prevention Plans, and Annual Accidental Fish Release Reports
c. Portions of reports prepared by Mott MacDonald for each of Cooke's net pens, and records cited therein, and related invoices
d. The Washington agency report regarding the collapse, dated January 30, 2018, and records cited therein
e. Cooke's response to the January 30, 2018 Washington agency report regarding the collapse
f. Photos and videos of the Cypress Site 2 structure after the collapse
g. Communications between Cooke and Washington agencies since the collapse, including records related to administrative enforcement and lease termination
h. Manufacturer specifications for cages installed at the net pen sites
i. Records related to Cooke's Best Aquaculture Practice certification
j. Mooring diagrams for the net pens
k. Responses by Cooke to discovery requests served by the Conservancy in the litigation
l. Records related to the July 2017 incident at Cypress Site 2
m. Daily Logs for the net pens
n. Spreadsheet related to Cooke's 2018 anchor inspections
o. Portions of the Deposition testimony of Jim Parsons, Cooke's designated Federal Rule of Civil Procedure 30(b)(6) witness

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SUMMARY OF OPINIONS

NET PENS EXCEEDING MANUFACTURERS' RATINGS

7. It is my professional opinion that conditions at six of Cooke's eight net pen sites (including Cypress Island 2) exceeded the maximum rated conditions specified by the net pen manufacturers, based on documentation provided thus far by Cooke. The loads at these sites exceeded the maximum rated conditions by exceeding the maximum current speed, significant wave height, net depth, minimum net mesh size, or a combination thereof.

8. Specifically, the Cypress Island 1 net pen system exceeded the manufacturer's rating for the maximum net depth and the minimum net mesh size.

9. The Port Angeles 1 net pen system exceeded the manufacturer's rating for net depth.

10. The Fort Ward, Orchard Rocks and Clam Bay net pen systems exceeded the manufacturer's rating for maximum current speed.

11. Net pen systems operated under conditions that exceed the manufacturers' ratings are at risk of partial or catastrophic failure during instances of extreme environmental loading, which can result in fish escapement.

LACK OF RIGOROUS CURRENT ANALYSIS

12. In addition to exceeding the pen manufacturer's maximum rated conditions, the risk of failure at each of these sites is exacerbated by the apparent lack of rigorous analyses of maximum current speed for any site.

13. To ensure that that net pens are not operated beyond their rated capacity, the Best Aquaculture Practices ("BAP") standard states that a meteorological and metocean study should be performed using methods in the Norwegian aquaculture standard NS 9415 or equivalent. I have reviewed and am familiar with NS 9415.

14. According to NS 9415, current, wave, and wind conditions with 10-year return periods and 50-year return periods at the local site are to be used when establishing the capacity of the net pen system. Currents must be quantified using a set of rigorous measurements

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collected over a month at the salmon farm site.

15. Cooke provided values for maximum current speed for each site in their permit application documents. However, the basis for these values is unknown. I found no evidence in the documents that have been produced thus far by Cooke in discovery that rigorous current, wave and wind studies were performed at any of the sites prior to 2017. Furthermore, I understand from deposition testimony that the results of the current studies commenced in 2017 have not yet been produced by Cooke.

FAILURE TO UNDERTAKE CAUSAL ANALYSIS

16. I understand from my review of Mr. Parsons' deposition testimony that Cooke failed to undertake an analysis to identify the causes or causes of the Cypress Site 2 net pen collapse that occurred in August 2017. Specifically, Mr. Parsons stated that "[n]o causal analysis was ever made by Cooke," as to the cause of the Cypress Site 2 collapse and that Cooke did not attempt to perform such an analysis.

17. While achieving certainty with regard to the cause may not have been possible, Cooke's failure to even attempt such an analysis deprives Cooke of critical information and data that it could apply to its other operations in order to reduce the risk of a similar collapse in the future. In other words, Cooke cannot be confident that any changes it has undertaken at its other net pen systems subsequent to the collapse will be successful in preventing a similar collapse because it has not done the analysis to link any of those changes to the root cause or causes of the Cypress 2 collapse.

18. The failure to undertake a causal analysis of the Cypress 2 collapse is particularly problematic with respect to the net pen systems still in operation because many of the issues identified above were also present at the Cypress 2 net pen system. For example, at the time of its collapse, the Cypress 2 system used stock nets that exceeded the manufacturer's rating for net depth and had a mesh size smaller than that specified by the manufacturer. Both of these factors result in increased drag forces and mooring tensions. The Cypress 2 net pen system also supported a predator net, which does not appear to be accounted for in the manufacturer's rating.

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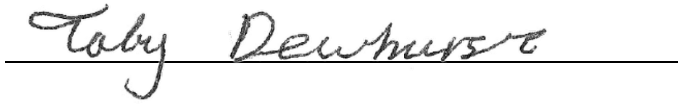
Lastly, the apparent absence of a rigorous current study leaves open the possibility that the Cypress 2 collapse was the result of operating the system in currents that exceeded the manufacturer's specifications. Based on Cooke's documentation that I have reviewed, various combinations of these issues persist at many of the remaining net pen sites. Thus, the remaining net pen systems may be at risk of partial or catastrophic failure during instances of extreme environmental loading, which could result in fish escapement.

19. I understand Cooke is still producing documents responsive to Plaintiff's discovery requests, and I reserve the right to modify my opinion based on my review of recently produced Cooke records and records Cooke produces subsequent to this declaration.

I declare under penalty of perjury under the laws of the United States of America that the foregoing is true and correct.

Executed this 1st day of April, 2019.



Tobias Dewhurst, PhD

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EXHIBIT A

Tobias Dewhurst

Hydrodynamics Engineer 937-207-4893
Maine Marine Composites tjdewhurst@gmail.com

SPECIALIZATIONS

Wave-structure Interaction | Hydrodynamics | Marine Renewable Energy | Aquaculture
Numerical Modeling | Wave/tow Tank Testing | Field Experiments| Data Analysis, Visualization

Experience

Maine Marine Composites *Project Engineer* September 2016–Present

Secured and managed commercial consulting projects and federally funded research projects in the design and analysis of ocean systems. Industries include marine renewable energy (wave, tidal, and floating offshore wind), aquaculture, lifting and construction applications, and various novel systems exposed to waves and currents.

University of New Hampshire December 2016

Doctor of Philosophy, Mechanical Engineering

Dissertation: *Dynamics of a Submersible Mussel Raft System*

Master of Science, Ocean Engineering May 2013

Thesis: *Muskeget Channel Tidal Energy Test Facility*

Cedarville University December 2009

Bachelor of Science, Mechanical Engineering

Minors in Math, International Business (courses at Dublin Business School, Ireland)

PEER REVIEWED PUBLICATIONS

Dewhurst, T., Hallowell, S.T., & Newell, C.R., 2019. *Dynamics of an Array of Submersible Mussel Rafts in Waves and Current.* Proc. of the 38th Conf. on Ocean, Offshore and Arctic Engineering, Glasgow. Accepted.

Simulation of an Axisymmetric, Pneumatic-PTO WEC in Operational and Survival Conditions for Model-Based Design, 2018. Dewhurst, T., MacNicoll, M, Akers, R. *Marine Energy Tech. Symposium Proc.*

Testing and Modelling the RTI F2 QD WEC (2017). Rohrer, J., Weise, N., Dewhurst, T., MacNicoll, M,. EWTEC 2017.

Dynamics of Submersible Mussel Rafts in Waves and Current. Wang, X., Swift, M. R., Dewhurst, T., Tsukrov, I., Celikkol, B., and Newell, C. 2015 China Ocean Engineering Journal, 29(3).

Dynamics of a Floating Platform Mounting a Hydrokinetic Turbine. Dewhurst, T., Swift, M. R., Wosnik, M., Baldwin, K., DeCew, J., & Rowell, M. 2013. Marine Technology Soc. Journal, 47(4).

Dewhurst T; Swift MR; Baldwin K; Wosnik M (2016) Design of a Mooring System for an Inertia Tube Wave Energy Converter. *Marine Energy Tech. Symposium Proc.*

Swift MR; Baldwin K; Bezerra, CAD; Dewhurst T; Sullivan, C (2016) A Student Designed and Built Wave Energy. *Marine Energy Tech. Symposium Proc.*

Dewhurst T; Rowell M; DeCew J; Baldwin K; Swift MR; Wosnik M (2012) Turbulent inflow and wake of a marine hydrokinetic turbine, including effects of wave motion. *Bull. Amer. Phys. Soc.*, Vol.57. No.17, p.146

CONFERENCE PRESENTATIONS AND PUBLICATIONS (Selected)

World Aquaculture Society Annual Meeting 2019
Dynamic Finite Element Modeling of a Macroalgae Longline Segment
Engineering Analysis of a Mooring Grid for an Array of Submersible Mussel Rafts
Spatial Extrapolation of Design Wave Conditions from a National Data Buoy Center Platform to a Local Aquaculture Site using Short-Term Measurements

Milford Aquaculture Seminar/Northeast Aquaculture Conference 2019
Analysis of an Array of Submersible Mussel Rafts in Storm Conditions
Design Considerations for a Kelp Longline Exposed to Waves and Currents
An instrument for measuring in-situ tensions in mooring system aquaculture gear

MTS/IEEE OCEANS 2018
A Design of Experiments based approach to engineering a robust mooring system for a submerged ADCP
Wave-to-Wire Modeling and Simulation of a Wave Energy Converter for Off-Grid and Micro-Grid Applications

World Aquaculture Society Annual Meeting 2018
Hydrodynamic characteristics of macroalgae grown on a long-line aquaculture system from physical model tests.

National Shellfisheries Association Annual Meeting 2017
Evaluation of a Submersible Mussel Raft for Use in Semi-Exposed Sites: Field Study
Evaluation of a Submers. Mussel Raft for Use in Semi-Exposed Sites: Numerical Modeling

Milford Aquaculture Seminar/Northeast Aquaculture Conference 2017
Evaluation of a Submersible Mussel Raft for Use in Semi-Exposed Sites

National Shellfisheries Association Annual Meeting 2014
Dynamics of a Submersible Mussel Raft in Waves and Current

Marine Renewable Energy Technical Conference 2013
Dynamics of a Surface Platform for Testing Hydrokinetic Turbines

UNH Graduate Research Conference 2013
Design Alternatives for the Muskeget Channel Tidal Energy Test Site

Global Marine Renewable Energy Conference 2011
Muskeget Channel Tidal Energy Test Site

HONORS

Joan and James Leitzel Award for Excellence in STEM Education and Outreach April 2015
UNH Dissertation Year Fellowship 2015-16

Best Presentation—UNH Marine School Graduate Research Symposium April 2015
Muhammad Yunus New Hampshire Social Business Innovation Challenge—3rd place September 2013
Outstanding Mechanical Engineering Senior in Design May 2009
Daniel Award for Scholarship and Character May 2009
NAIA Scholar Athlete December 2008

TEACHING

ME 526 – Mechanics of Materials, TA 2013
Teaching one recitation class per week, grading, one-on-one help, review sessions
ME 747 – Experimental Measurement and Modeling of Complex Systems, TA 2012
Helping design and run lab experiments, grading, one-on-one help
OE 810 – Ocean Measurements Lab, Guest Lecturer 2012

PROFESSIONAL SERVICE AND OUTREACH ACTIVITIES

Technical Advisory Group US Shadow Committee for IEC TS 62600-2:2016 Marine energy - Wave, tidal and other water current converters - Part 2: Design requirements for marine energy systems.
Reviewer: Aquaculture Engineering 2017–present
Reviewer: Marine Energy Technology Symposium 2018
Fishermen's Forum. *Technical Strategies for Anchoring Floating Aquaculture Structures* 2019
North Hampton Middle School Buoy Project 2013-2016
Designed curriculum with science and math teachers around the physics of buoys, culminating in students testing their models in the UNH wave tank. Included real-time, interactive internet broadcast of wave energy/aquaculture experiments.
North Hampton Middle School Buoy Project 2013-2016
Designed curriculum with science and math teachers around the physics of buoys, culminating in students testing their models in the UNH wave tank. Included real-time, interactive internet broadcast of wave energy/aquaculture experiments.
College Success Foundation Higher Education Readiness Opportunity Program 2013
Designed and gave short, simple wave tank demonstrations and lessons on buoy dynamics to groups of at-risk, college-bound teenagers.
University of New Hampshire Engineering Camp 2013